U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Pediocactus peeblesianus* var. *fickeiseniae*

COMMON NAME: Fickeisen plains cactus

LEAD REGION: Region 2

INFORMATION CURRENT AS OF: April 2006

STATUS/ACTION:

___ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status
___ New candidate
_X__ Continuing candidate
___ Non-petitioned
_X__ Petitioned - Date petition received: May 11, 2004
__ 90-day positive - FR date:
__ 12-month warranted but precluded - FR date:
__ Did the petition requesting a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:
a. Is listing warranted (if yes, see summary of threats below)? Yes
b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes
c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.
During the past 12 months, almost our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements; emergency listings; and essential litigation-related administrative, and program management functions. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the 12 months, see the discussion of "Progress on Revising the Lists" in the current CNOR which can be viewed on our Internet website (http://endangered.fws.gov/).
__Yes_ Listing priority change
Former LP: __6_
New LP: __3_
Date when the species first became a Candidate (as currently defined): July 1, 1975

___ Candidate removal: Former LP: ___
___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or

continuance of candidate status.

___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F – Range is no longer a U.S. territory.

___ I – Insufficient information exists on biological vulnerability and threats to support listing.

___ M – Taxon mistakenly included in past notice of review.

___ N – Taxon does not meet the Act's definition of "species."

___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Plant, Cactaceae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Arizona

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Coconino and Mohave counties, Arizona

LAND OWNERSHIP: The Fickeisen plains cactus occurs on lands managed by the U.S. Bureau of Land Management (BLM), the Navajo Nation, the Arizona State Land Department, U.S. Forest Service, and possibly on private land. The majority of the habitat is managed by BLM.

LEAD REGION CONTACT: Susan Jacobsen (505) 248-6641

LEAD FIELD OFFICE CONTACT: Mima Falk, Arizona Ecological Services Field Office, Tucson sub-office, 520-670-6150 ext 225

BIOLOGICAL INFORMATION:

Taxonomy

All of the following information is from Heil (1981). The taxon was discovered by Mr. and Mrs. Denis Cowper in May 1956. At that time, the plants were identified by W. Marshall Taylor, of the Desert Botanical Garden, as *Toumeya peeblesiana*. Lyman Benson collected specimens near Cameron, Arizona in 1957 and 1959. Benson published the name *Pediocactus peeblesianus* var. *fickeisenii* in 1962 to describe these cacti. Benson changed the ending of the varietal name to var. *fickeiseniae* (indicating that the variety was named after a woman) in 1969. Other synonyms that have been used are *Navajoa fickeisenii* and *Toumeya fickeisenii*. Heil (1981) recognized the name and taxon in a review of the genus *Pediocactus*.

Species Description

Fickeisen plains cactus is a very small (2.5- 6 cm tall, 2-5.5 cm in diameter), unbranched cactus that shrinks into gravelly soils after flowering and fruiting, especially during dry periods. The stems are covered with tubercles; each tubercle has 3-7 radial spines (4-7 mm long) and one central spine (15-18 mm long). The central spine is whitish, and curved upward. All spines are corky. The flowers are cream-yellow or yellowish-green, about 2.5 cm in diameter, and produced on the apex of the stem. The plants flower in April. Fruit is shaped like a top, smooth,

turning reddish-brown at maturity.

Habitat

The taxon is endemic to soils derived from exposed layers of Kaibab limestone on canyon margins and well-drained hills in Navajoan desert or grasslands, at elevations between 1310-1660 meters (m) (4298-5446 feet (ft.) (U.S. Fish and Wildlife Service 1992).

Historic and Current Range and Status

The Fickeisen plains cactus is known from the Gray Mountain vicinity to the Arizona Strip in Coconino and Mohave counties, Arizona. Information regarding the historical range and status of the species is quite limited. Phillips (1982) estimated that there were approximately eight populations scattered over a range of approximately 200 kilometers (km) (124 miles (mi). These populations are located in northern Arizona from hills in northeastern Mohave County to the vicinity of the Colorado and Little Colorado rivers in the region of the Grand Canyon and southeast in Coconino County (Benson 1982). The sites are isolated from one another by topography and unsuitable habitat. The populations were fairly small and the average densities measured at two sites were 3.5 plants/100 m^2 (Phillips et al. 1982).

The range of the cactus has not changed since the Benson description of 1982. In 2006, the Arizona Game and Fish Department noted 22 element occurrences for the species, including historical ones (Sabra Schwartz, AFGD, pers. comm. 2006).

The majority of suitable habitat on BLM lands has been surveyed, and the number of plants on BLM lands is estimated to be less than 1,000 individuals and possibly less than 500 (Lee Hughes, BLM, pers. comm. 2005). Hughes stated that the plants are scattered and difficult to find. There are four BLM monitoring plots, which are placed in areas of relatively dense concentrations of the species, and have been in place since 1986. Two of the plots, Dutchman and North Canyon, track specific cacti over time. Clayhole and Sunshine are transects where numbers of cacti are counted as detected, but the smaller cacti often are undetected, so the numbers are not as accurate as in the other plots. Since 1986, cacti in all plots have had various levels of mortality, and numbers have fluctuated in the plots. Seed production seems low, and increases in recruitment and survival are related to wet years. Overall recruitment has been relatively low and there seems to be higher numbers of missing and/or dead cacti in drought years (2002 was a very dry year). The plots have had several years where recruitment was relatively high, but the numbers did not stay high and, in general, since 1986, the plots have stabilized with low numbers. These cacti do retract into the ground during dry periods and may not reappear for several years. It is often difficult to assess mortality in the monitoring plots for this reason. A summary of data from 2002, 2004 and 2005 is presented in Table 1. For comparison, the number of cacti present in each plot in 1986 (when the monitoring plots were established), were Dutchman (21), Clayhole (22), Sunshine (6), and North Canyon (14). During 1989 and the early 1990's, all plots contained relatively high numbers of cacti: Dutchman had 194 in 1991, Clayhole had 35 in 1992, Sunshine had 44 in 1992, and North Canyon had 36 in 1991 (Hughes 1995).

Table 1: BLM Monitoring Data for Fickeisens Plains Cactus

Plot	Total 2002	Total 2004	Total 2005	R 2002	R 2004	R 2005	M 2002	M 2004	M 2005
Dutchman	30	45	34	1	2	0	39	11	14
Clayhole	60	59	59	1	4	3	16	10	25
Sunshine	12	7	33	6	1	4	0	6	0
North Canyon	24	40	40	1	7	0	15	10	11

R= Recruitment
M= Mortality/Missing

Hughes estimates that 30-40 percent of occupied habitat on the BLM land is captured by the monitoring plots (Hughes, BLM, pers. comm. 2005). BLM monitoring found that individuals of the taxon have been trampled by livestock, and a large plant and six offshoots (stepped on by livestock in 2002) died during the last monitoring period in 2005. In 2004, six plants were killed by trampling in the Sunshine monitoring plot.

The Navajo Natural Heritage program (1994) surveyed for this species on the Navajo Nation, and documented the presence of 280 cacti. Recently, D. Roth (botanist for the Navajo Nation) reported she believes the populations are in decline. She could find no more than 15 individuals in each population she visited. She will start monitoring this species in the spring of 2006 (Roth e-mail correspondence 2005).

The Kaibab National Forest has not monitored the species and has no population estimates. They did find a new cluster of plants (a few individuals) in 2004 (B. Phillips, USFS, pers. comm. 2005). They manage a very small portion of the habitat.

THREATS

A. <u>The present or threatened destruction, modification, or curtailment of its habitat or range</u>. The main human-induced threats to this cactus and its habitat are off-road vehicles and trampling associated with livestock grazing. Trampling from livestock has been observed in monitoring plots established for this species (Hughes 2004). It is also possible that the habitat of the cactus may be modified by livestock grazing. Trampling in occupied habitat may compact the soil and could lead to reductions in germination. All of the known locations of this species on BLM lands are within BLM grazing allotments (Hughes, BLM, pers. comm. 2005). We cannot quantify the amount of trampling from livestock, or the effects of trampling on this species and its habitat from the BLM monitoring plots, because the plots were not designed to address these effects.

Mortality of plants has also been associated with drought conditions, which have been on-going for at least the last four years and are predicted to continue for some time in the future (Thomas et. al. 2004). Hughes (1995) reported that mortality within the monitoring plots was due to rodent predation, drought, and old age. In 1992, Hughes noted that rodent predation resulted in the death of 26 cacti in the North Canyon plot. Rodent predation has been observed on *Pediocactus peeblesianus* var. *peeblesianus* and has contributed significantly to the decline of

those monitored individuals (Phillips and Phillips 2004). The increased rodent predation was correlated with dry conditions and lack of herbaceous forage in the area. We do not understand the effects (if any) of reduced herbaceous vegetation near this cactus, or if livestock grazing is affecting the habitat.

Plants that are near roads (i.e., the Navajo Trail) have been run over, and road maintenance activities have affected individual plants of this taxon and habitat. In other words, plants have been run over and damaged, and the habitat has been altered, most likely by compaction. The BLM is making an effort to coordinate these activities and minimize effects by marking plants and informing maintenance personnel (Hughes, BLM, pers. comm. 2005). Unauthorized off-road vehicle use has also affected plants and habitat near roads, and unauthorized camping near roads may be affecting the species. We cannot quantify the extent of these impacts on the taxon or its habitat, but they continue at some unknown level. There has been a renewed interest in uranium mining, but the habitat that supports uranium is not the habitat where this cactus is found (Hughes, BLM, pers. comm. 2005). The BLM will continue to survey for the species when mining claims are activated. Roads to mining claims may affect this species and its habitat.

B. Overutilization for commercial, recreational, scientific, or educational purposes. Illegal collection is a potential threat for all species of cacti, but it is a specific and definite threat for the genus *Pediocactus*. Phillips (1982) states "This cactus is in worldwide demand by collectors of rare cacti, and removal of plants from native habitats by both private collectors and commercial suppliers is significant." *P. winkleri*, a federally listed species, is collected illegally from Capitol Reef National Park in southern Utah (National Park Service 2004).

We spoke to a cactus grower in New Mexico who sells various species of *Pediocactus*, mainly through legally procured seed and a limited number of specimens grown from seed. He stated that the collection pressure for this species, *Pediocactus peeblesianus* and its varieties, has greatly decreased because growers in Europe produce quite a few plants. In addition, collectors have become much more sensitive about collecting live specimens and prefer photographing specimens in their native setting, rather than removing them (S. Brach pers. comm. 2005).

For the period 1994-1997, the Convention on International Trade in Endangered Species (CITIES) annual report documented a total of 5 specimens and 5015 seeds of Fickeisen plains cactus exported (CITES 1998). We do not know what impact illegal collection has on this species. In their 2003-2004 monitoring summary, the BLM reported that there had been vandalism on one of the monitoring plots, but it does not specify the type or extent of damage. One population of this species was noted in a 1978 file note as being seriously reduced (Gierisch 1978). We are not able to determine if vandalism was the cause of the reduction in numbers. Patrol of these areas is infrequent, because they are in very remote locations.

We are not aware of any recent evidence of illegal collection. Service law enforcement staff was unable to find any information on legal or illegal shipments of this taxon in their database (e-mail correspondence from K. Looney, 2006). This species is protected (restrictions on collection) by the Arizona Native Plant Law, which prohibits collection without obtaining a permit, and plants may not be moved off of private property without contacting the Arizona

Department of Agriculture. The Arizona Native Plant Law does not protect the habitat. If illegal collection has occurred we are unable to quantify the effects to the species

C. Disease or predation. Rodent predation on the taxon has been observed on the BLM monitoring plots; it is a source of mortality for this cactus. It is unknown whether the occasional high numbers of cacti eaten by rodents and other herbivores is directly due to drought, or indirectly due to drought since livestock may graze other plants needed by herbivores, thus forcing herbivores to utilize this cactus (Hughes 1996). The role of rodent predation in the natural history of this taxon is unknown. We do not know the background levels of rodent predation, and the current monitoring plots do not address this question. We assume that in drought years, when herbaceous cover is reduced, cacti are eaten. If drought continues over a prolonged period, the effects on the overall population of this taxon may be significant, given its low seed production and low overall survival of recruits. We know of no diseases that are affecting this taxon.

D. The inadequacy of existing regulatory mechanisms. This cactus is protected from collection by the Arizona Native Plant Law (Arizona Game and Fish Department 1999) and CITES; however, CITES does not regulate take or domestic trade. The Arizona law prohibits collection of members of the genus *Pediocactus* in particular and all members of the family Cactaceae (Phillips et al. 1982). This taxon is considered a sensitive species by both the BLM and the Forest Service. The BLM considers the needs of this species in its allotment management planning. In fact, the monitoring plots were established within grazing allotments, in part, to determine if current grazing operations are affecting this taxon. BLM policy (BLM Manual 6840) states "The BLM will carry out management, consistent with the principles of multiple use, for the conservation of candidate species and their habitats and will ensure that actions authorized, funded, or carried out do not contribute to the need to list any species as threatened or endangered." The Forest Service policy in regards to sensitive species management does not allow for activities that will reduce the population viability of sensitive species on Forest Service lands. The Kaibab National Forest Plan has specific standards and guidelines (S and Gs) for the management of sensitive species; S and Gs 960 and 961 call for the identification, protection and improvement of habitat for listed and sensitive species. The plants on the Kaibab National Forest are within a grazing allotment, and livestock grazing has been modified within this allotment to protect this taxon. The allotment is only grazed during the winter, when the plants are retracted, to minimize the direct effects of trampling from livestock. This taxon is listed as category 3 on the Navajo Nation's list of threatened, endangered, and sensitive species. Projects that need the review of the Nation are required to address the effects of the project on the species. There is a fine or imprisonment for "taking" individuals of this taxon on the Navajo Nation.

E. Other natural or manmade factors affecting its continued existence. The monitoring done by the BLM and recent observations of the populations on the Navajo Nation suggest that numbers of this species are declining. One of the factors that may be contributing to this decline is the continuing drought. Arizona has had below average rainfall for at least the last four years (2001-2005), and in some areas longer than that. The results from the BLM monitoring suggest that seedling recruitment and survival has been low (Hughes 1995). Adult plants, which would be responsible for the production of seeds, have been removed from the population through predation (Hughes 1995). Observations from the BLM plots and for monitoring plots on

Pediocactus peeblesianus var. *peeblesianus*, a federally listed closely related species, show high germination is related to the timing and quantity of rainfall. A moderate increase in numbers may occur two to three times every ten years. It is not known if there is a sufficient seed bank present in the soil to sustain these populations over time.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED: A conservation agreement continues to be under consideration in cooperation with the BLM. However, the proposed conservation strategy and agreement was last worked on in 1995 and is in need of additional development. At this point, the conservation agreement as proposed has not included landowners beyond the BLM. In the draft conservation agreement, the BLM had agreed to continue monitoring the taxon, complete inventory on BLM lands, analyze the soil in occupied habitats, and update the allotment management plans that contain the taxon. To date, the BLM has continued to monitor the species, continues to inventory potential habitat, has completed the soil analysis and has entered into allotment management planning (e-mail correspondence Hughes 2005). The Forest Service has indicated that they are willing to be included in the conservation agreement, and recently we initiated discussions with the Nation regarding their cooperation. We would like to reactivate work on finishing this conservation agreement in the next 2-3 years, pending availability of resources and interest of the other parties.

SUMMARY OF THREATS: The largest number of plants of this taxon is on BLM lands, where fewer than 1,000, and possibly fewer than 500 individuals, are estimated to occur. The 1994 survey of Navajo Nation lands documented the presence of 280 individuals, but the botanist for the Nation believes the populations are in decline. The Kaibab National Forest has not monitored this species and has no population estimate, although they found a cluster of a few individuals in 2004. Thus the Fickeisen plains cactus remains within a limited distribution, few extant populations are known, and the populations are small in size. The taxon has been affected by the on-going drought and rodent predation, as have many populations of small cacti species. Due to its narrow range, the populations are vulnerable to local extirpation associated with stochastic events. Habitat and populations remain vulnerable to off-road vehicle use, and, to a lesser extent, possible effects from livestock grazing (trampling) (factor A).

LISTING PRIORITY .

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	**Imminent**	Monotypic genus	1
		Species	2
		Subspecies/population	**3**
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate To Low	Imminent	Monotypic genus	7
		Species	8

	Non-imminent	Subspecies/population Monotypic genus Species Subspecies/population	9 10 11 12

Rationale for listing priority number:

Magnitude: Anthropogenic threats to the plains cactus are associated with habitat destruction and modification, primarily as a result of livestock trampling, and off-road vehicle activity. Both of these activities continue to occur in the habitat of this rare species. Since all of the locations of this species on BLM lands are within grazing allotments, and the monitoring data provide evidence that trampling of plants does occur, we conclude that the threats are on-going, but we do not know how many individuals are affected. We are aware that some unauthorized off-road activity and road maintenance activities have affected this species and its habitat, and these effects seem to be on-going, but we are unable to quantify how much habitat or plants have been negatively affected by these activities. The species seems to have been targeted by illegal collection in the past, but this threat seems to be reduced due to commercial production and availability of specimens in the commercial trade. Plants of this species seem to be in decline on the Navajo Nation. We do not know why. The status of plants on the Forest Service is unknown, but they manage only a small percent of the habitat. Within the BLM monitoring plots, overall numbers are fluctuating and there seems to be a downward trend, suggesting that the overall numbers in the population are declining. Drought and herbivore predation seem to be contributing to this decline. Given this situation, management actions on BLM lands would be important in conserving this species, since some effects are out of human control (i.e. drought). Since most of the populations are on BLM lands where the threats are on-going, we continue to conclude that the threats are high.

Imminence: The threats listed above are on-going on BLM lands (where the majority of the species occurs), and may be present on Navajo lands. Based on this, we conclude that the threats are imminent. In our prior assessments, we concluded that threats were not imminent. However, using a consistent interpretation of imminence (across the Service) related to whether threats are on-going, we are correcting our ranking to reflect that the threats are imminent. As a result, the LPN for this species is changing from 6 to 3.

__X__ Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes.

Is Emergency Listing Warranted? No. This cactus is protected from collection by the Arizona Native Plant Law. The Arizona law prohibits collection of members of the genus *Pediocactus* in particular and all members of the family Cactaceae. Collecting pressure for this species has been reduced due to its availability in the commercial trade. On-going activities, such as livestock grazing and unauthorized off-road vehicle use have removed individuals of this taxon from the population, but not to the extent that the overall population has shown a dramatic decline which could lead to extirpation of the taxon. Drought continues to affect the population, but not to the extent that populations are in danger of immediate extirpation.

DESCRIPTION OF MONITORING: The BLM has 4 monitoring plots set up on the Arizona Strip District. Their 2000-2004 monitoring update shows that this cactus has been affected by drought conditions. Many individuals have retracted into the soil and have not been seen for several years. In one instance, two individuals were missing for over 5 years, and just reappeared last year. Recruitment has been consistently low in the past, but some areas received good fall rains and there were increases in population numbers on two of the plots (BLM 2004).

COORDINATION WITH STATES

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: None

Indicate which State(s) did not provide any information or comments: Arizona Department of Agriculture (agency with jurisdiction over plants in the state) reviewed this form and had no comments.

LITERATURE CITED

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U.S. Fish and Wildlife Service. 1992. Handbook of Arizona's Endangered, Threatened and Candidate Plants. U. S. Fish and Wildlife Service, Arizona Ecological Services State Office, Phoenix, Arizona.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: /s/ Benjamin N. Tuggle 6/23/2006
Acting Regional Director, Fish and Wildlife Service Date

Concur: August 23, 2006
Director, Fish and Wildlife Service Date

Do not concur: _____
Director, Fish and Wildlife Service Date

Date of annual review: April 2006
Conducted by: M. Falk